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WATER QUALITY MEMORANDUM

Utah Coal Regulatory Program

September 20, 2010

TO: Internal File

THRU: Jim Smith, Permit Supervisor 9/21/10

FROM: Steve Christensen, Environmental Scientist

RE: 2010 First Quarter Water Monitoring, West Ridge Resources, West Ridge Mine, Task ID #3490

The West Ridge Mine is currently operational in the Book Cliff Mountain range of Carbon County, UT. Water monitoring data is submitted quarterly to the Division EDI database. Beginning on page 7-34 of the approved Mining and Reclamation Plan (MRP), water monitoring protocols and sampling requirements are provided for surface water, ground water, monitoring wells and UPDES outfalls in Tables 7-1, 7-2, 7-3 and 7-4 respectively.

1. Was data submitted for all of the MRP required sites? YES ☒ NO ☐

Springs

The approved MRP outlines the monitoring of 10 springs. Four of the springs (SP-12, SP-13, SP-15 and SP-16) discharge from the lower slopes of West Ridge in Whitmore Canyon. Two springs (WR-1 and WR-2) discharge from the upper slope of West Ridge in Whitmore Canyon. One spring (SP-8) discharges in the upper drainage of C Canyon. Hanging Rock Spring (S-80) is located near the northwest corner of the permit area and discharges from the east slopes of Whitmore Canyon. Spring 101 monitors Little Spring at the bottom of West Ridge. Spring 102 is located within Spring Canyon.

Due to access issues, none of the spring monitoring sites could be sampled this quarter.

Streams

The approved MRP outlines the monitoring of 12 stream sites. Grassy Trail Creek is the only perennial stream in the permit and adjacent areas. Operational sampling is required quarterly for six stream sites (ST-3, ST-8, ST-9, ST-10, ST-13 and ST-15). Sites ST-11 and ST-12 were added to the water-monitoring program based upon field inspections conducted in 2005.

The field inspections were conducted as part of a proposed lease expansion by the Permittee. At the time of the inspections, the Bear Canyon drainage had exhibited measurable flow. As a precaution, sites ST-11 and ST-12 were established within that drainage. Since that time (summer of 2005) neither site has produced appreciable/measurable flow. However, the sites remain as part of the surface water monitoring program and are inspected quarterly.

Four stream monitoring sites were accessible this quarter (ST-5, ST-6, ST-11 and ST-13). Of those four sites, ST-5 and ST-6 recorded a measurable flow and were sampled for laboratory analysis. ST-11 and ST-13 were accessible, but recorded zero flow for the quarter.

Wells

Quarterly operational sampling is required for one groundwater-monitoring well (Site DH 86-2).

Monitoring well DH 86-2 was sampled during this quarter and all required data submitted.

UPDES

Operational sampling is required monthly for two active UPDES sites (Permit # UT0025640). Site D001 is the mine sites primary sediment pond discharge to the ephemeral 'C' Canyon drainage. Site D002 is the mine-water discharge to the ephemeral 'C' Canyon drainage. Specific limitations and self-monitoring requirements as outlined in the UPDES permit are presented in the table below:

Effluent Characteristics	Effluent Limitations
Flow, MGD (million gallons per day)	1.0
Total Suspended Solids (TSS), ppm	70
Total Iron, ppm	1.3
Oil & Grease, ppm	10
Total Dissolved Solids (TDS), ppm	2,000
pH	9

The Permittee submitted all required samples per the terms of the UPDES discharge permit. Site 001 did not report a discharge for this quarter. Site 002 averaged a flow of 538 gallons per minute (gpm) based on 5 sampling events.

2. Were all required parameters reported for each site? YES ☒ NO ☐

Surface Water Monitoring Sites: All required parameters were reported for accessible sites with measurable flow.

Groundwater and Well Monitoring Sites: All required parameters were reported for accessible sites with measurable flow.

UPDES: Site D001 did not produce any discharge during this quarter. All required parameters were reported for Site D002.

3. Were any irregularities found in the data? YES ☒ NO ☐

Surface Water Monitoring Sites-

ST-5- Flow values at monitoring site ST-5 have been historically erratic. Flow values had been steadily increasing until the 4th quarter of 2008. Since that time, the reported flow values had been decreasing. However, the flow value reported this quarter was 4.01 standard deviations from the mean with a reported value of 1,481 gpm. The average flow value at ST-5 is 149.26 gpm. The majority of the flow within this ephemeral drainage is produced from the mine-water discharge.

As the flow at this site is generated primarily from the mine-water discharge, particular attention has been paid to the TSS and T-Fe values. As discussed in detail below (UPDES Section), these two parameters have shown significant upward trends within the mine-water discharge. The reported TSS value decreased this quarter from 28 ppm to 12 ppm. However, T-Fe concentrations increased slightly from 0.733 ppm the previous quarter to 0.824 ppm this quarter. Both the reported TSS and T-Fe values were within two standard deviations from the mean.

ST-6- As with site ST-5, the majority of the flow within this drainage comes from the mine-water discharge.

As with monitoring site ST-5, ST-6 has historically produced erratic flow values. The flow value reported this quarter was 2.59 standard deviations from the mean with a reported value of 1,166 gpm. The average flow value for this site is 202 gpm.

With the exception of flow, all reported concentrations of the required water quality parameters were within two standard deviations from the mean. Reported TSS and T-Fe concentrations were lower than the previous quarter. TSS dropped from 32 ppm the previous quarter to 15 ppm this quarter. Similarly, the reported T-Fe concentration dropped from 1.182 ppm the previous quarter to 0.724 ppm this quarter.

Groundwater Monitoring Sites- Due to access issues, none of the spring monitoring sites could be sampled this quarter. However, several irregularities were reported the previous quarter (WQ09-4). Once accessible and sampled, monitoring will continue to determine if the previous quarter's irregularities were isolated.

Monitoring Well DH 86-2 TDS, its associated components and total hardness (T-Hdns) have been trending upward for several quarters. D-Ca, D-Mg, SO4, T-Hdns and TDS all reported values outside of two standard deviations from the mean. It's unknown what's causing this upward trend. Continued monitoring will be conducted in order to evaluate what may be causing this shift in water chemistry.

UPDES Sites- (UPDES Permit #UT0025640)

Site D001- UPDES outfall D001 (primary sediment pond at mine site) did not report a discharge this quarter.

Site D002- Site 002 averaged a flow of 538 gallons per minute (gpm) based on 5 measurements. Historically, UPDES Outfall 002 has exhibited fluctuating levels of TSS and T-Fe. Reported TSS concentrations were well within the 70 ppm UPDES limit (15 and 14 ppm based on two sampling events).

T-Fe was analyzed two times during the quarter. The UPDES compliance limit for T-Fe is 1.3 ppm. A value of 1.438 ppm was reported on February 9th, 2010. The Division of Water Quality is aware of the elevated T-Fe value and continued monitoring will be conducted.

4. On what date does the MRP require a five-year re-sampling of baseline water data.

On page 7-35 of the approved MRP, the Permittee commits to collecting baseline samples "*from each spring in the monitoring program during the low flow (fall) sampling and from each stream monitoring sites during low flow every five years beginning with the first mid-term review.*"

Baseline sampling of ground and surface water sites will be required during the 3rd quarter of 2011.

5. Based on your review, what further actions, if any, do you recommend?

Continue to monitor the data irregularities cited above for any trends.

6. Does the Mine Operator need to submit more information to fulfill this quarter's monitoring requirements? YES ☐ NO ☒

7. Follow-up from last quarter, if necessary. YES ☐ NO ☒

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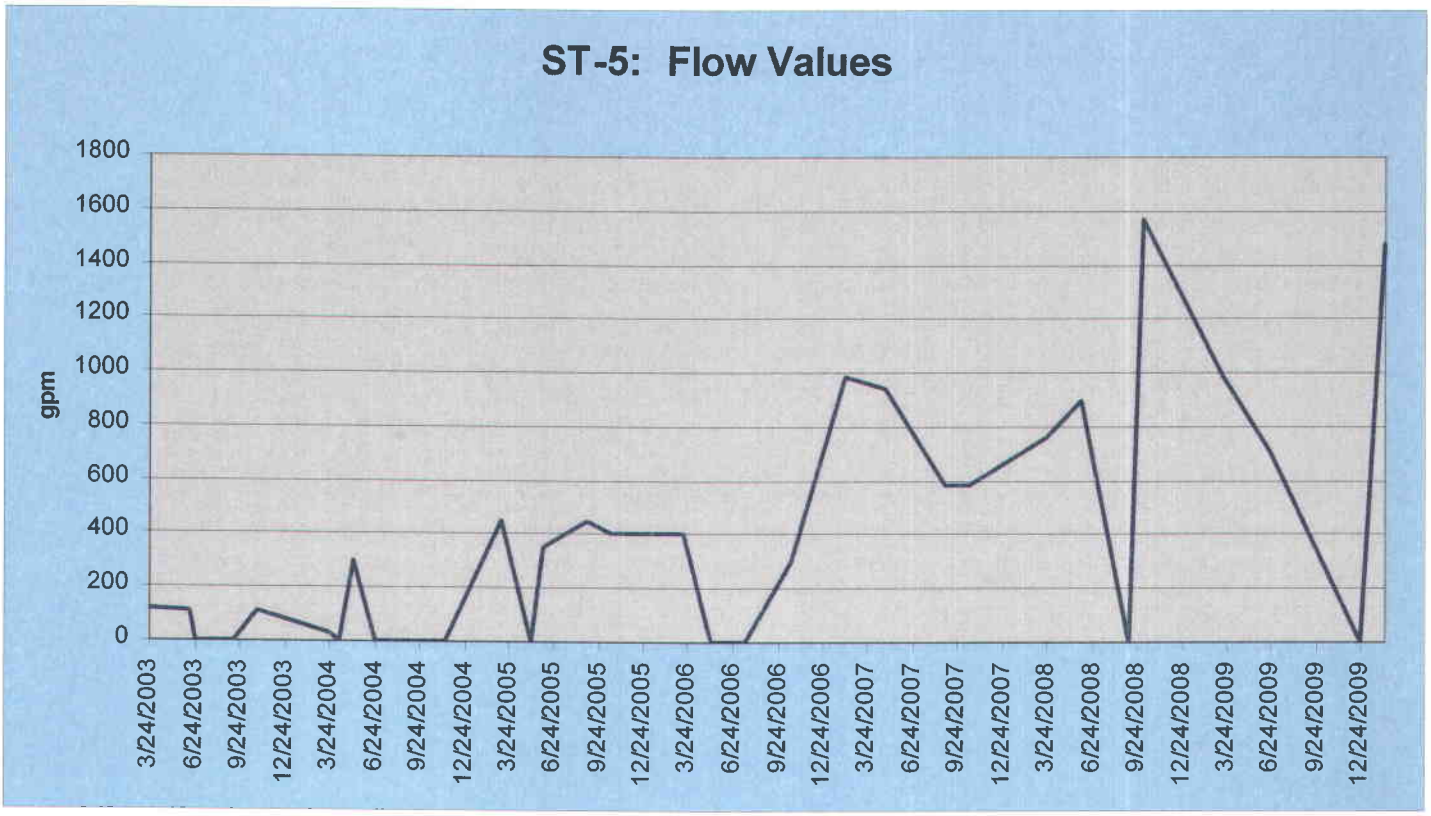
ST-5: Flow Values
gpm
1800
1600
1400
1200
1000
800
600
400
200
0
3/24/2003
6/24/2003
9/24/2003
12/24/2003
3/24/2004
6/24/2004
9/24/2004
12/24/2004
3/24/2005
6/24/2005
9/24/2005
12/24/2005
3/24/2006
6/24/2006
9/24/2006
12/24/2006
3/24/2007
6/24/2007
9/24/2007
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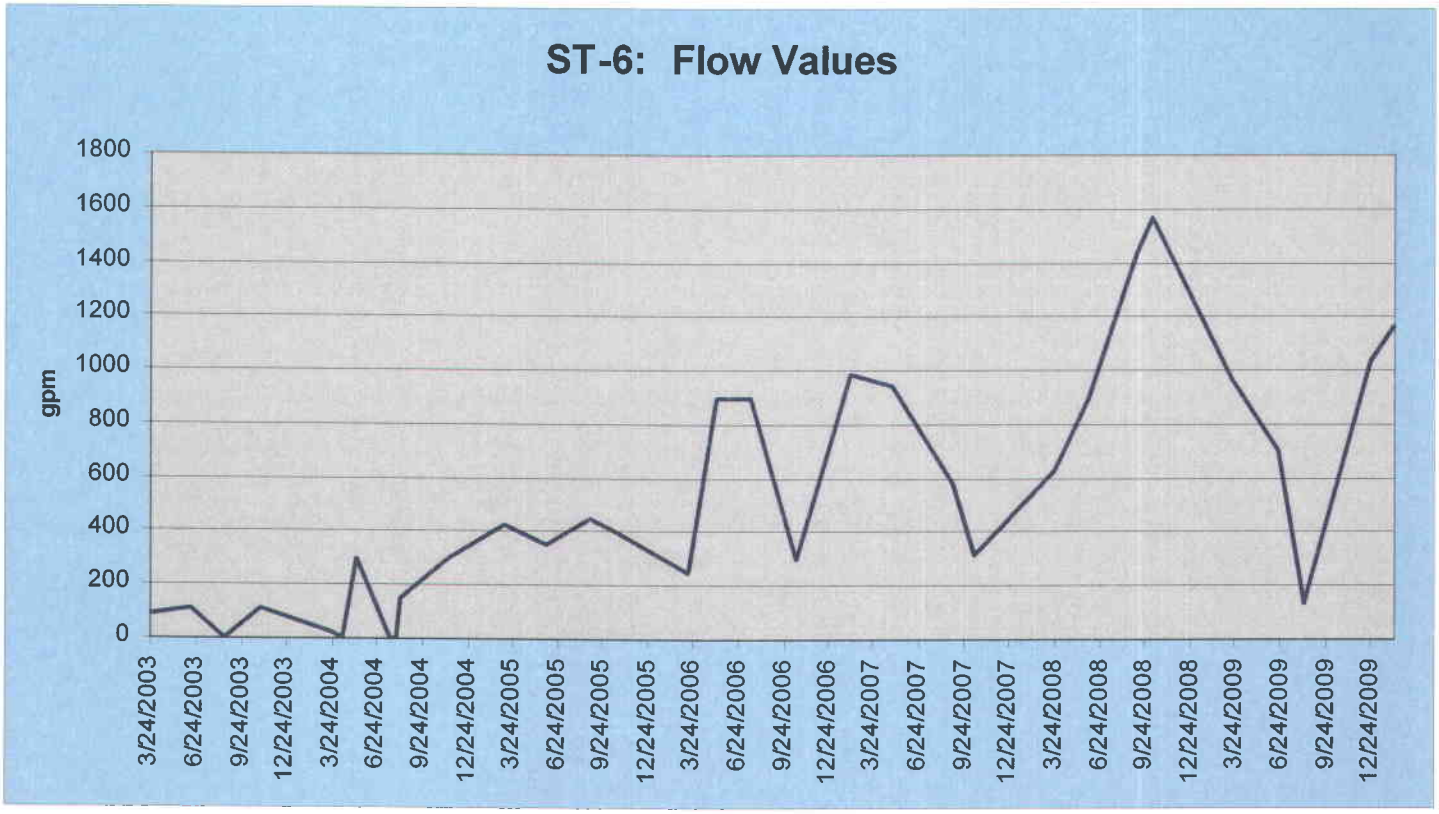
9/24/2009
12/24/2009


ST-6: Flow Values
gpm
1800
1600
1400
1200
1000
800
600
400
200
0
3/24/2003
6/24/2003
9/24/2003
12/24/2003
3/24/2004
6/24/2004
9/24/2004
12/24/2004
3/24/2005
6/24/2005
9/24/2005
12/24/2005
3/24/2006
6/24/2006
9/24/2006
12/24/2006
3/24/2007
6/24/2007
9/24/2007
12/24/2007
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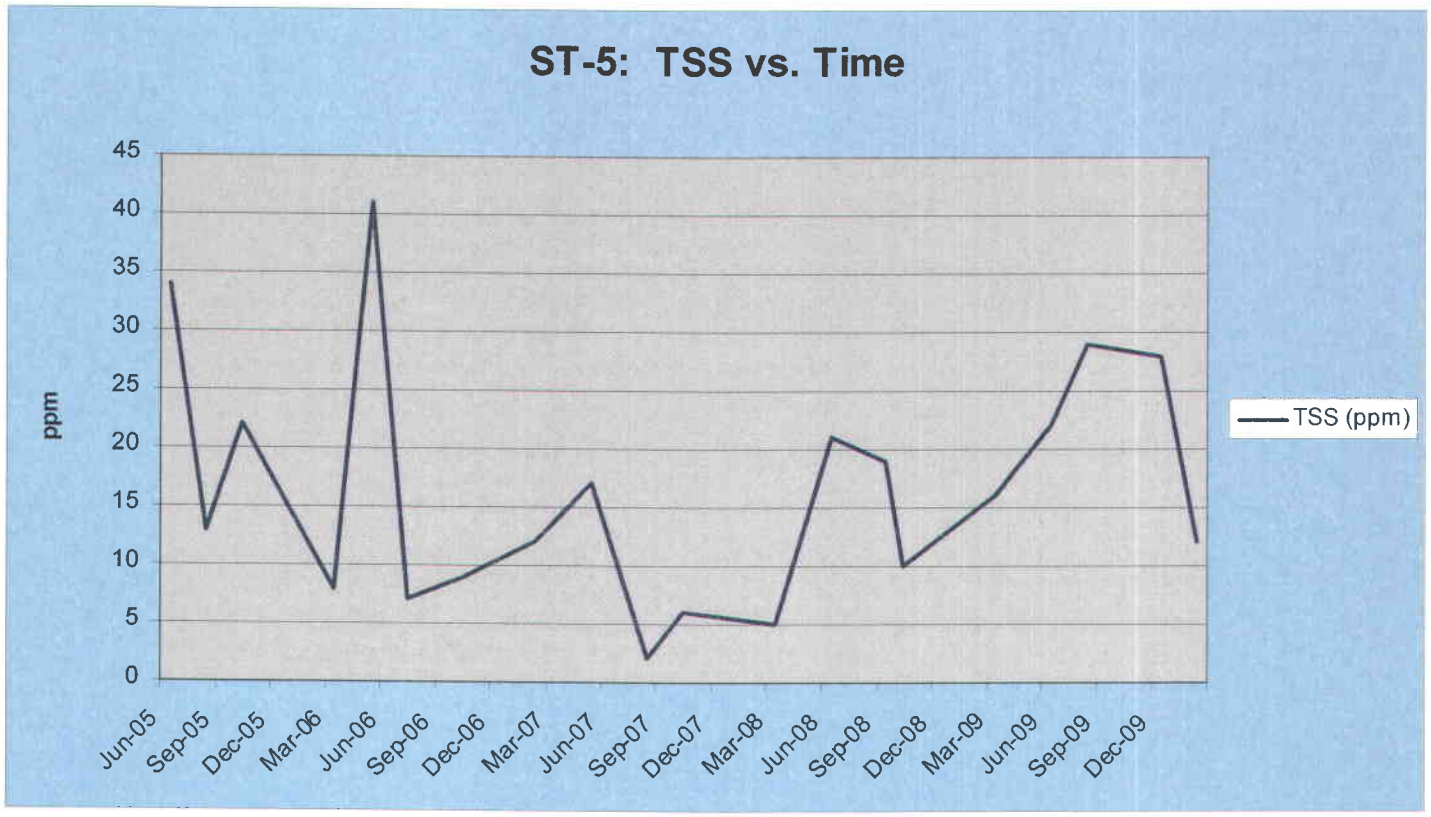
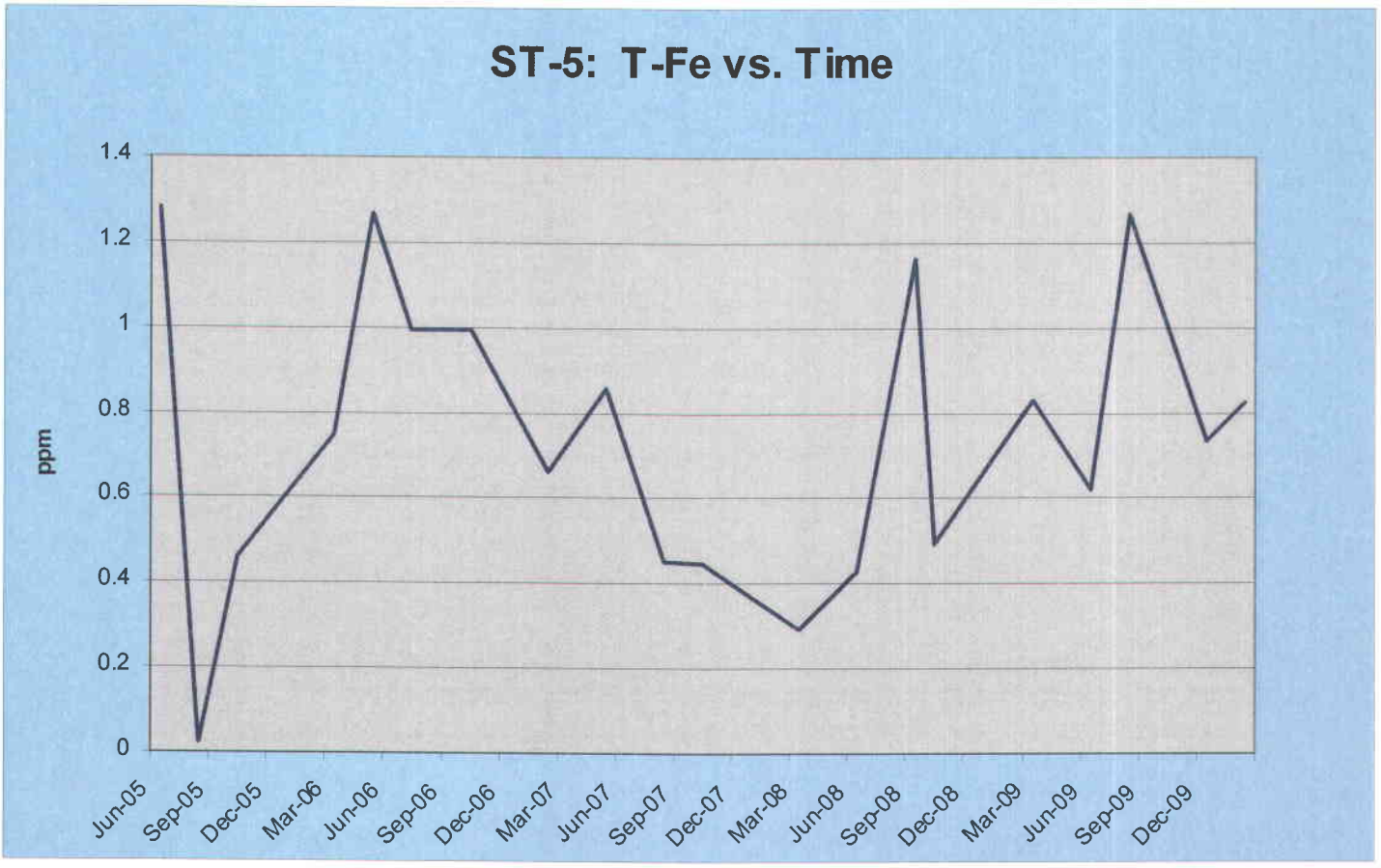
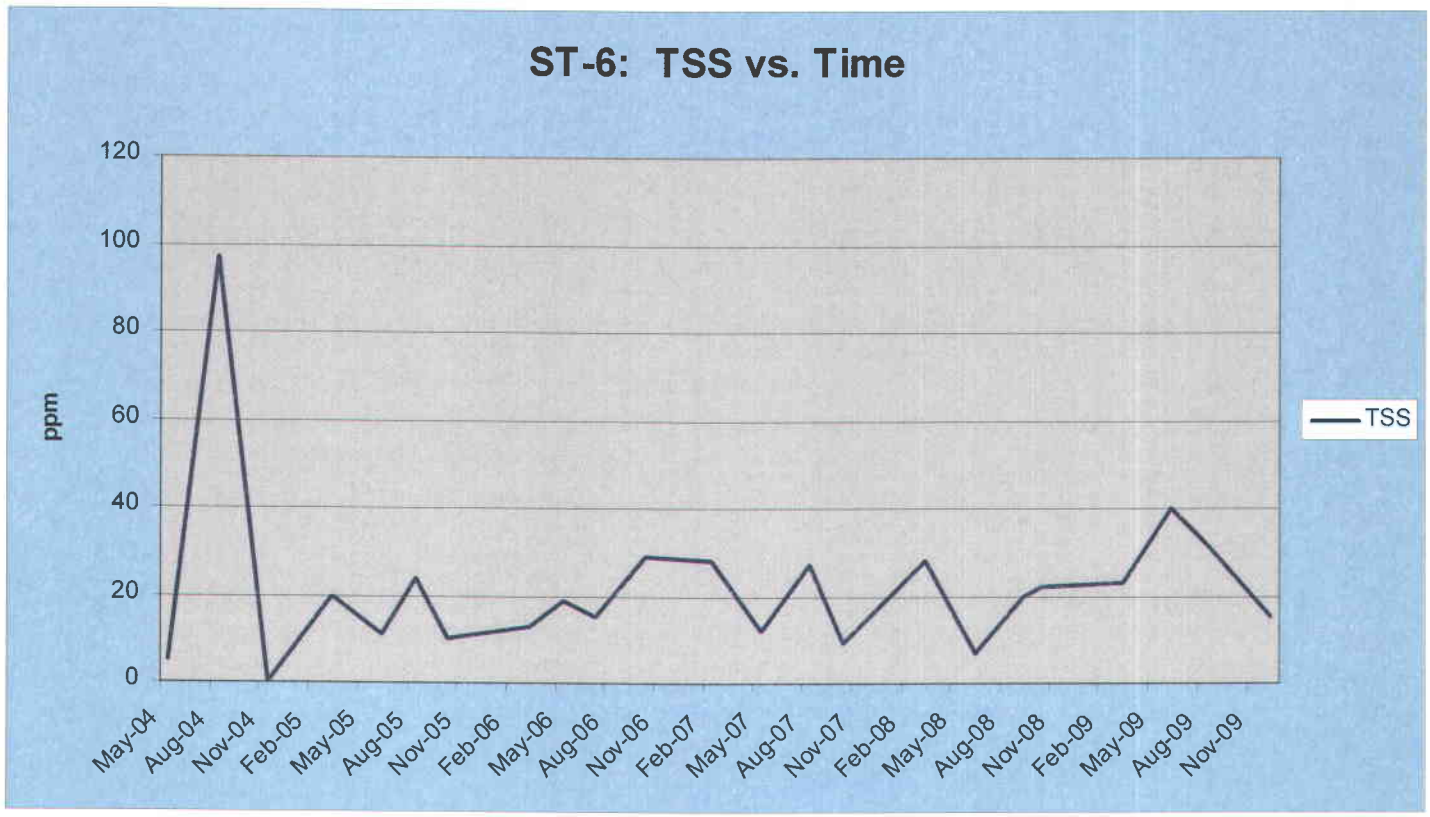
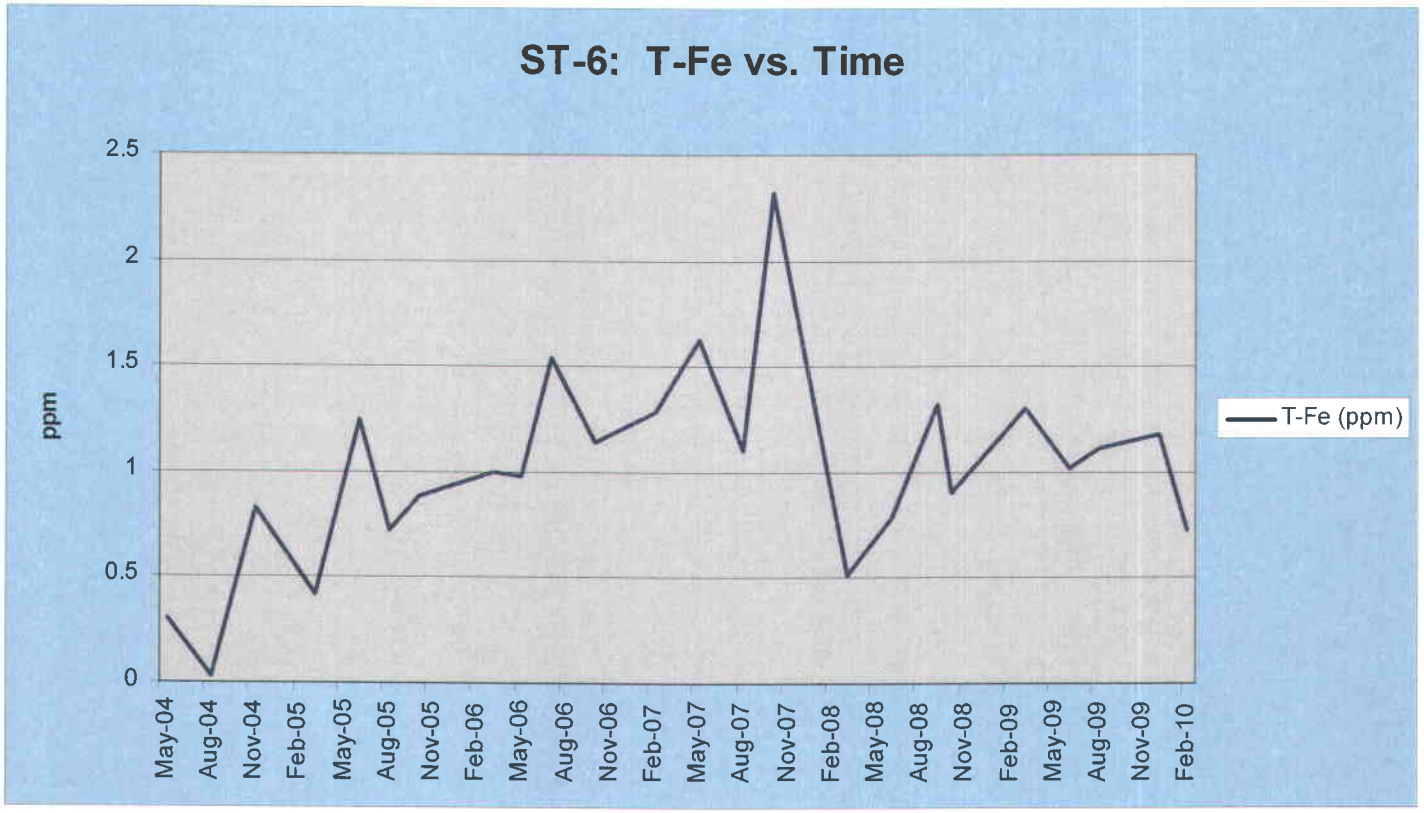
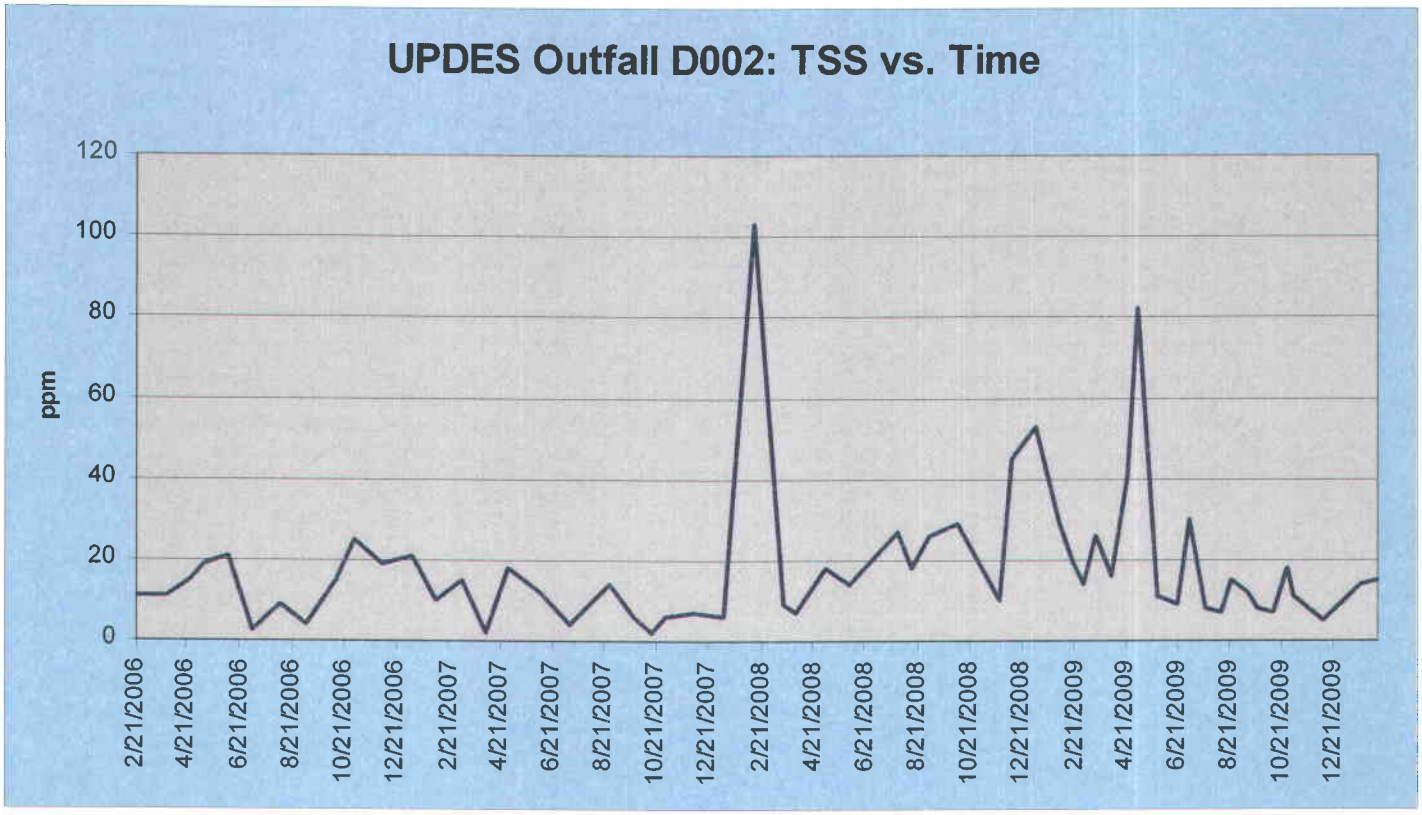
3/24/2009
6/24/2009
9/24/2009
12/24/2009


ST-5: TSS vs. Time
ppm
45
40
35
30
25
20
15
10
5
0
Jun-05
Sep-05
Dec-05
Mar-06
Jun-06
Sep-06
Dec-06
Mar-07
Jun-07
Sep-07
Dec-07
Mar-08
Jun-08
Sep-08
Dec-08
Mar-09
Jun-09
Sep-09
Dec-09
TSS (ppm)


ST-5: T-Fe vs. Time
ppm
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Jun-05
Sep-05
Dec-05
Mar-06
Jun-06
Sep-06
Dec-06
Mar-07
Jun-07
Sep-07
Dec-07
Mar-08
Jun-08
Sep-08
Dec-08
Mar-09
Jun-09
Sep-09
Dec-09


ST-6: TSS vs. Time
ppm
120
100
80
60
40
20
0
May-04
Aug-04
Nov-04
Feb-05
May-05
Aug-05
Nov-05
Feb-06
May-06
Aug-06
Nov-06
Feb-07
May-07
Aug-07
Nov-07
Feb-08
May-08
Aug-08
Nov-08
Feb-09
May-09
Aug-09
Nov-09
TSS


ST-6: T-Fe vs. Time
ppm
2.5
2
1.5
1
0.5
0
May-04
Aug-04
Nov-04
Feb-05
May-05
Aug-05
Nov-05
Feb-06
May-06
Aug-06
Nov-06
Feb-07
May-07
Aug-07
Nov-07
Feb-08
May-08
Aug-08
Nov-08
Feb-09
May-09
Aug-09
Nov-09
Feb-10
T-Fe (ppm)


UPDES Outfall D002: TSS vs. Time
ppm
120
100
80
60
40
20
0
2/21/2006
4/21/2006
6/21/2006
8/21/2006
10/21/2006
12/21/2006
2/21/2007
4/21/2007
6/21/2007
8/21/2007
10/21/2007
12/21/2007
2/21/2008
4/21/2008
6/21/2008
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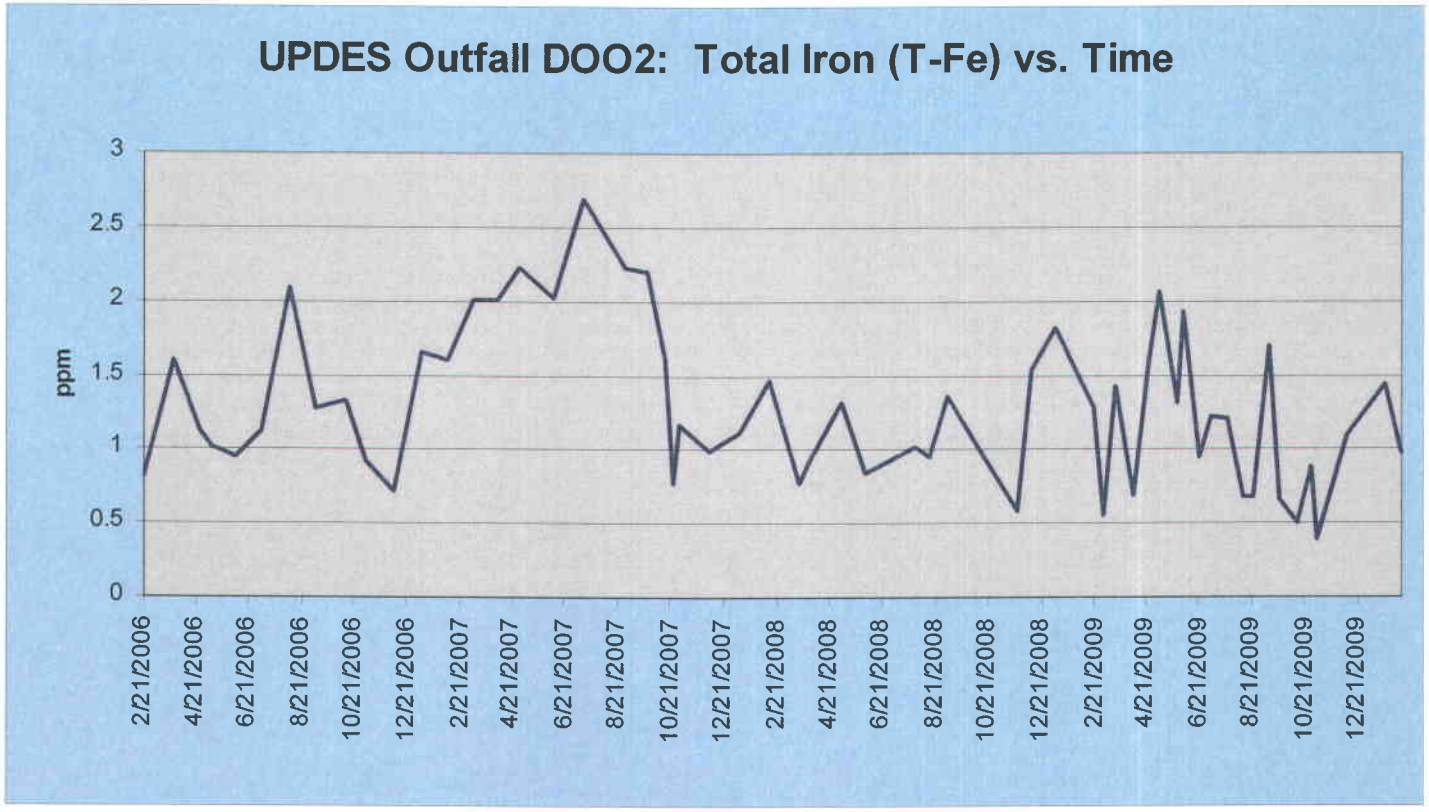
6/21/2009
8/21/2009
10/21/2009
12/21/2009


UPDES Outfall DOO2: Total Iron (T-Fe) vs. Time
ppm
3
2.5
2
1.5
1
0.5
0
2/21/2006
4/21/2006
6/21/2006
8/21/2006
10/21/2006
12/21/2006
2/21/2007
4/21/2007
6/21/2007
8/21/2007
10/21/2007
12/21/2007
2/21/2008
4/21/2008
6/21/2008
8/21/2008
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12/21/2008
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8/21/2009
10/21/2009
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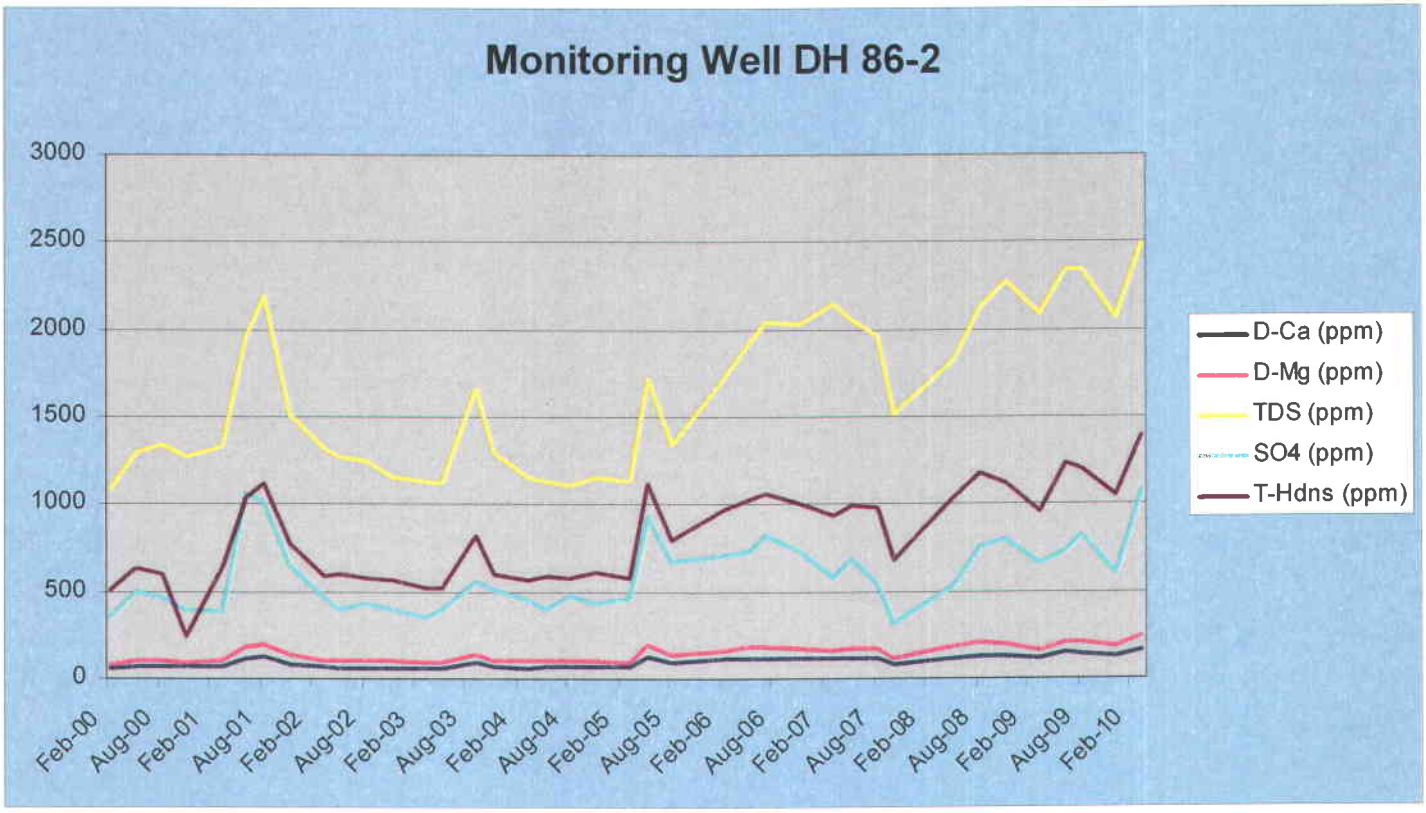
Monitoring Well DH 86-2
3000
2500
2000
1500
1000
500
0
Feb-00
Aug-00
Feb-01
Aug-01
Feb-02
Aug-02
Feb-03
Aug-03
Feb-04
Aug-04
Feb-05
Aug-05
Feb-06
Aug-06
Feb-07
Aug-07
Feb-08
Aug-08
Feb-09
Aug-09
Feb-10
D-Ca (ppm)
D-Mg (ppm)
TDS (ppm)
SO4 (ppm)
T-Hdns (ppm)